TECHNOLOGY SAFETY DATA SHEET
Pegasus International, Inc.
Marcrist DTF 25 Diamond Floor Shaving System

<table>
<tr><td colspan="2">SECTION 1: TECHNOLOGY IDENTITY</td></tr>
<tr><td rowspan="2">Manufacturer’s Name and Address:

Pegasus International, Inc.
106 Railroad Street
Schenley, PA 15682</td><td>Emergency Contact:

Paul Boudreaux, Project Engineer
Pegasus International, Inc.
724-845-2838
724-845-1794 fax</td></tr>
<tr><td>Information Contact:

Paul Boudreaux, Project Engineer
Pegasus International, Inc.
724-845-2838
724-845-1794 fax</td></tr>
<tr><td>Other Names:

Floor Shaver</td><td>Preparer:

Operating Engineers National Hazmat Program
1293 Airport Road
Beaver, WV 25813
phone (304) 253-8674
fax (304) 253-7758

Under cooperative agreement DE-FC21-95 MC 32260</td></tr>
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SECTION 2: PROCESS DESCRIPTION

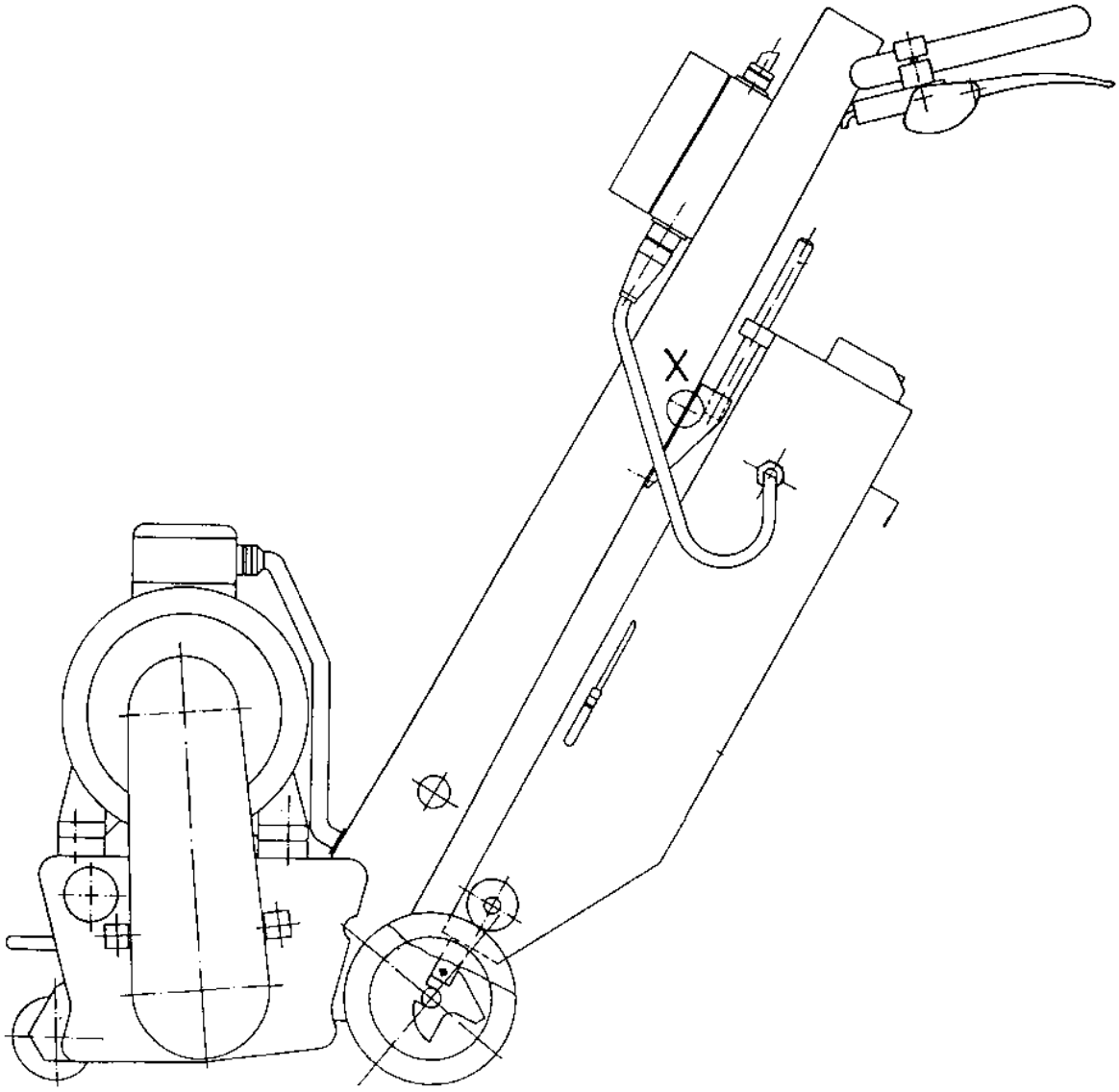
The Marcrist unit is a commercially-available, self-propelled device that is operated by one individual who guides the device from behind, much like a garden tractor. The cutting head is a drum that contains embedded diamonds and is controlled by the operator from the handles. Once engaged, the unit can continue scabbling while moving forward, without the operator.

The depth of the cut can easily be set at the handle by turning a control knob. It is important that the cutting head be kept above the floor surface while starting the unit. The speed of the unit is controlled by a knob on the side of the device. which remains constant until adjusted again. The device can operate from a slow crawl up to the speed of a moderate walk.

The diamond cutting head is a roller that rotates towards the front of the device. The cutting head is enclosed in a metal pan that prevents thrown blades from hitting the operator. The cutting blades can be configured in several ways allowing different modes of removal. For this test, the widest available cut was performed, approximately 250 mm removal of a band of floor. The cut can be set up for a depth of from 0.1 to 15mm for each pass. The greater the depth on each pass, the rougher the finished surface.

The unit is designed to be operated with a dust collection system to draw away dust as it is generated at the source.

SECTION 3: PROCESS DIAGRAM



SECTION 4: CONTAMINANTS AND MEDIA
The Marcrist unit is designed to remove contaminated floor surfaces. In the DOE weapons complex, the chemicals found most often on floor surfaces are petroleum products and chlorinated hydrocarbons. There is also considerable contamination from low-level radiation. The concrete dust released from the floor shaving operation is also contaminated and should be captured at the source with sufficient vacuum from a high efficiency (HEPA) vacuum unit.

SECTION 5: ASSOCIATED SAFETY HAZARDS	
Probability of Occurrence of Hazard: **1 Hazard may be present but not expected over background level** **2 Some level of hazard above background level known to be present** **3 High hazard potential** **4 Potential for imminent danger to life and health**	
A. ELECTRICAL (LOCKOUT/TAGOUT)	**RISK RATING: 2**
The Marcrist unit runs on electricity so there is the potential for shock. The unit is rated for 480 volts, 3 phase electrical hookup. The self-propelled nature of the unit increases the risk that the unit could run over the electric cord. A strain relief device on the cord would reduce this risk.	
B. FIRE AND EXPLOSION	**RISK RATING: N/A**
There are no flammable gases or liquids used with the Marcrist unit, nor are any produced. Consequently, fires and explosions are not hazards associated with this device.	
C. CONFINED SPACE ENTRY	**RISK RATING: N/A**
Not part of this technology.	
D. MECHANICAL HAZARDS	**RISK RATING: 2**
The rotating drum presents a potentially serious mechanical hazard but it is well guarded. Maintenance work should only be performed with the electrical cord disconnected.	
E. PRESSURE HAZARDS	**RISK RATING: N/A**
Marcrist equipment uses electro-hydraulic power. Consequently, significant pressure is not part of this technology.	
F. TRIPPING AND FALLING	**RISK RATING: 2**
The power cord for the DTF-25 poses a tripping hazard.	
G. LADDERS AND PLATFORMS	**RISK RATING: N/A**
Not part of this technology.	
H. MOVING VEHICLES	**RISK RATING: 1**
The DTF-25 is small enough to be moved by any type of vehicle and does not	

SECTION 5: ASSOCIATED SAFETY HAZARDS	
have special requirements for transportation.	
I. BURIED UTILITIES, DRUMS, AND TANKS	**RISK RATING: N/A**
Not part of this technology.	
J. PROTRUDING OBJECTS	**RISK RATING 1**
The DTF-25 is well designed and does not have any significant protruding objects	
K. GAS CYLINDERS	**RISK RATING: N/A**
Not part of this technology.	
L. TRENCHING AND EXCAVATIONS	**RISK RATING: N/A**
Not part of this technology.	
M. OVERHEAD LIFTS	**RISK RATING: N/A**
Not part of this technology.	
N. OVERHEAD HAZARDS	**RISK RATING: N/A**
Not part of this technology.	

SECTION 6: ASSOCIATED HEALTH HAZARDS	
A. INHALATION HAZARD	**RISK RATING: 1**
Inhalation hazards associated with Marcrist would be in connection with the type of environment in which it is scheduled to be operated. This should be assessed by the site characterization and an appropriate air sampling plan developed.	
B. SKIN ABSORPTION	**RISK RATING: 1**
Hydraulic fluid may pose slight absorption risk.	
C. HEAT STRESS	**RISK RATING: 2**
If a worker operates the DTF-25 in protective clothing and respirator, particularly on a hot day or in a hot environment, heat stress may become a concern. This hazard will need to be considered on a site-by-site and job-by-job basis.	
D. NOISE	**RISK RATING: 2**
The DTF-25 generated levels of noise that would potentially require incorporating the operator in a hearing conservation program under OSHA's noise requirements. Hearing protection may also be needed. Further monitoring is warranted.	
E. NON-IONIZING RADIATION	**RISK RATING: N/A**
Not a part of this technology.	

SECTION 6: ASSOCIATED HEALTH HAZARDS (cont)	
F. IONIZING RADIATION	**RISK RATING: 2**
This technology does not generate radiation but is designed to cleanup floors contaminated with alpha particles. Consequently, radiation protection must be considered and the ventilation system has to be carefully maintained to reduce the potential for exposure.	
G. COLD STRESS	**RISK RATING: 1**
Cold stress will be determined by the environment in which the DTF-25 is operating. The extent of this hazard needs to be determined on a site-by-site job-by-job basis.	
H. ERGONOMIC HAZARDS	**RISK RATING: 2**
The Marcrist DTF-25 moves on its own which greatly reduces the strain on the operator. Having to bend over to adjust the speed induces strain but this operation does not have to be done often. Attempting to unload and load the unit without mechanical support poses the greatest risk of back problems.	
I. OTHER	**RISK RATING: N/A**
None	

SECTION 7: PHASE ANALYSIS
A. CONSTRUCTION/START-UP
The unit needs to be off-loaded from the transport vehicle with some type of mechanical lift. The unit has lifting lugs that cables can be attached to for moving the unit with a crane. Each time the machine is used in a different location, it is essential to check that the motor direction is correct. The manufacturer provides a CEE plug to change the direction of rotation. To change the direction, the diamond drum must be clear of the surface. The electric motor should be momentarily started to be sure the drum is rotating in the correct direction. If not, the CEE plug should be used to change the phase. **The area must be clear of debris and water prior to setting up the unit for operation. Additionally, a HEPA vacuum must be attached to draw away dust at the source. The vacuum unit must be checked to assure the filter is seated properly and the pressure drop across the filter is acceptable. Additionally, the connection to the DTF-25 must be tight and the vacuum hose stretched out to reduce the potential of tripping operators and attendants. The electrical cord should be similarly positioned – running over the cord with the shaver poses the risk of electrocution.**

SECTION 7: PHASE ANALYSIS (CONTINUED)

B. OPERATION

Before actually operating the unit, the shaving depth must be set. Using the rotary control located on the top of the handle, the diamond drum must be lowered to the surface to be shaved but it must not be rotating at the time. Once the drum is touching the surface, the depth indication should be set to zero by loosening the wing-nut holding the adjusting collar and rotating the collar. The surface to be shaved is now the zero position. The drum must be raised.

Be sure all safety equipment is in place before starting the unit. Start the vacuum system first. Do not operate the machine without using the advance drive system as this acts as a brake and speed control. Pull in the drive lever located on the handle, making sure that the advanced feed motor is set to zero. Then turn the speed control located on the side of the advance feed motor to zero and put the control on the top of the advance feed to 1 or 2. Slowly turn the speed control until a suitable speed is achieved. Return the switch located on the advance feed motor to zero.

All wheels must be touching the ground and the diamond drum raised before start up. Under no circumstances should the machine be started with the drum in contact with the ground. Switch the power on and wait until full speed is achieved, about 15 seconds. The diamond drum is now rotating. Lower the drum by rotating the rotary depth control on top of the handle until the required depth is achieved.

Even though the unit will now self-propel, it is important not to release full control until satisfied that the cut is of appropriate quality and depth and the vacuum is operating sufficiently. Never allow the unit to operate more than a few feet away, particularly when approaching walls or obstacles. To stop the machine, move the advance motor switch to zero, raise the diamond drum, and switch off the electric motor.

C. MAINTENANCE

The power cord must be disconnected before starting any maintenance work. Additionally, if the work requires the unit to be raised, it is advisable to block the drum and not rely solely on the weight of the handle along the floor to keep the drum exposed. After using the shaver a short time the drum becomes very hot. Always wear gloves to work with the drum. Follow the Marcrist manual for safely and effectively performing maintenance activities such as changing the drum.

C. DECOMMISSIONING

The Marcrist unit will require wet wiping on all surfaces when all shaving is

SECTION 7: PHASE ANALYSIS (CONTINUED)

complete. If radioactively or chemically contaminated surfaces have been shaved, the cleaning of the unit should take place in appropriate personal protective equipment. The HEPA vacuum unit should be left running until the DTF-25 has been shut down. When disconnecting the HEPA vacuum hose, affix duct tape to both ends to prevent release of contamination during transport. All precautions followed during unloading should be followed for the loading of the unit onto the transport vehicle to prevent back strain and injuries.

SECTION 8: HEALTH AND SAFETY PLAN REQUIRED ELEMENTS

A. AIR MONITORING

When concrete is shaved, total and respirable dust need to be monitored. Monitoring also needs to be done for specific concrete contaminants, particularly alpha particles. In addition, noise monitoring is essential.

B. WORKER TRAINING

Training that would apply in this case may include but not be limited to: HAZWOPER (Hazardous Waste Operations and Emergency Response), HAZCOM (Hazard Communication), Respiratory Protection, Hearing Conservation, Ergonomics (proper lifting, bending, stooping, kneeling), specific training for equipment operation, CPR/First Aid/Emergency Response/Bloodborne Pathogens, Electrical Safety, Lockout/Tagout, Radiation Safety,

C. EMERGENCY RESPONSE

Emergency response planning for a site needs to assure adequate coverage for hazards described in the TSDS. Having at least one person per shift trained in CPR and first aid is recommended.

D. MEDICAL SURVEILLANCE

Medical surveillance as specified by the OSHA standards needs to be conducted. Initial and annual audiograms may be required based on initial noise monitoring.

E. INFORMATIONAL PROGRAM

Workers must be trained in specific operation of equipment before use.

SECTION 9: COMMENTS AND SPECIAL CONSIDERATIONS

Only personnel who have been adequately trained in the operation of this technology should be permitted to operate and/or work with the equipment.